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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,639	10/12/2000	Arnaud Hory	HORY 2,PCT/U	8500

466 7590 07/28/2003
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EXAMINER

FIORILLA, CHRISTOPHER A

ART UNIT	PAPER NUMBER
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1731

DATE MAILED: 07/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/622,639	Applicant(s) HORY ET AL.	
	Examiner Christopher A. Fiorilla	Art Unit 1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-16 is/are allowed.
- 6) ☒ Claim(s) 17-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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1. Claims 22-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 22, step 4, the phrase "the heated layer" has no antecedent basis.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 17-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin (5,354,414) in view of Deckard (5,639,070) and Dictionary of Ceramic Science and Engineering by O'Bannon.

Feygin teaches the basic claimed process for the rapid prototyping by sintering a powder.

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The process of Feygin includes the steps of:

obtaining a series of digitized superposed sections of an object to be produced from a three dimensional representation of said object (e.g. col. 5, lines 47-51),
spreading the powder in the form of a thin layer (e.g. col. 5, lines 62-65),
increasing the density of the layer by mechanical compacting (e.g. col. 5, lines 62-65),
bringing the densified layer to the sintering temperature by sweeping with a laser beam said layer (e.g. col. 6, line 2).

Feygin also discloses that the powder may be ceramic (col. 11, line 23), and the laser may be a YAG laser (col. 10, line 67).

Feygin does not specifically disclose heating the layer of powder prior to bringing it to the sintering temperature.

Deckard discloses a similar process for producing parts by selective sintering. Deckard, however, discloses heating the layer of powder to be sintered prior to sintering. It would have been obvious to one skilled in the art at the time of the invention to include this heating step in the process of Feygin to reduce shrinkage as disclosed by Deckard. Note that although Feygin does not specifically recite that the sintering therein is solid phase, it is submitted that this is indeed the case. Page 232 of Dictionary of Ceramic Science and Engineering by O'Bannon defines sintering as "the bonding of powdered materials by solid-state reactions at temperatures lower than those required for the formation of a liquid phase"

Determination of the specific heating temperature and laser wavelength would have been

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well within the realm of routine experimentation to one having ordinary skill in the art at the time of the invention. These parameters would have obviously been selected to optimize the process conditions and/or the properties of the final product.

5. Applicant's arguments filed May 1, 2003 have been fully considered but they are not persuasive.

With respect to the rejection of the claims under 35 USC 103 applicants argue:

FEYGIN describes a process for rapid prototyping with a laser beam which changes the physical or chemical properties of the powders. FEYGIN does not disclose that the sintering is in solid phase.

Even if FEYGIN uses the word "sintering", his use of the word does not correspond to the definition set forth in the Dictionary of Ceramic Science and Engineering and further his "sintering" is not that recited.

At col. 6, lines 2-7 of FEYGIN, it is stated that "The powder affected by the laser beam changes its physical or chemical properties. Most often this change results in sintering or melting of the powder and fusing the material within the boundaries of a cross-section as well as bonding it to the previous cross-section."

Applicants respectfully submit that the wording "sintering or melting and fusing" (underlining added) used by FEYGIN confirms that a liquid phase is produced.

In view of the above remarks, applicants submit that FEYGIN does not encompass a process of "sintering in solid phase", as required by the present claims.

These arguments are not persuasive. Although FEYGIN discloses that the laser beam changes the physical or chemical properties of the powders, it does not indicate that this change requires the creation of a liquid phase. In fact at col. 6, lines 4-5, FEYGIN recits, "Most often this change results in sintering or melting". Since FEYGIN states that sintering or melting can occur it is reasoned that if sintering takes place, melting does not (i.e. no liquid phase is created). Applicants' statement that the wording "sintering or melting and fusing" used by FEYGIN

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confirms that a liquid phase is produced is not well taken. First, it is submitted that the use of quotation marks by applicants is inaccurate in that it does not appear that this specific language is used in the specification. (The examiner assumes that this refers to the language at col. 6, first paragraph—please provide location if this is inaccurate). Secondly, it is not understood how this language confirms that a liquid phase is produced upon sintering.

6. Claims 13-16 are allowed.

7. The following is a statement of reasons for the indication of allowable subject matter:
The prior art of record does not teach or suggest a process for rapid prototyping by sintering in solid phase with a laser as substantially set forth in the claims wherein the heating is maintained while repeating the spreading, heating and sintering steps.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher A. Fiorilla whose telephone number is 703-308-0674. The examiner can normally be reached on M-F, 6:30am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on 703-308-1164. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7718 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Christopher A. Fiorilla
Primary Examiner
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